

2. A Revision of the Genera of Scorpions of the Family *Buthidæ*, with Descriptions of some South-African Species. By R. I. Pocock, of the British Museum (Nat. Hist.).

(Plates XIII. & XIV.)

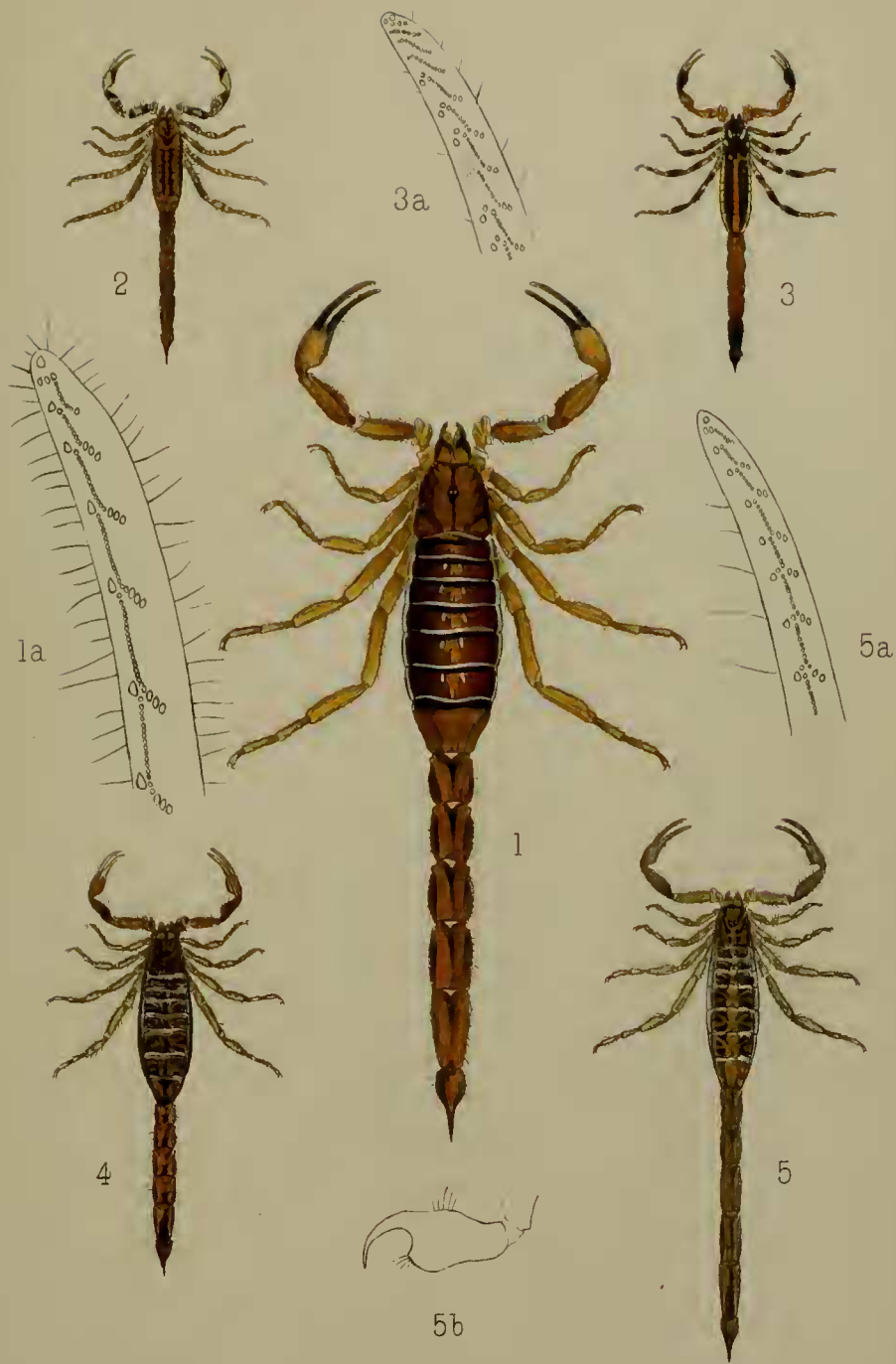
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In 1876, when Dr. Thorell revised the classification of the Scorpions, he divided the *Buthidæ*, or *Androctonoideæ*, as he called them, into two subfamilies—the *Androctonini* for those genera possessing two inferior teeth on the immovable digit of the chelicerae, and the *Centrurini* for those with one tooth in this position, or none. It is needless here to enter upon the reasons which have led me to the conclusion that this division into subfamilies did not, at the time it was proposed, represent accurately the state of our knowledge of the affinities of the genera composing them; for doubtless, at the present moment, in view of the number of new forms that have been brought to light since 1876, Dr. Thorell would be the first to abandon his classification. It will be sufficient here to state that an examination of the rich material of *Buthidæ* contained in the British Museum has convinced me that the members of this family are too closely related to allow of its subdivision into groups of greater value than is usually accorded to genera.

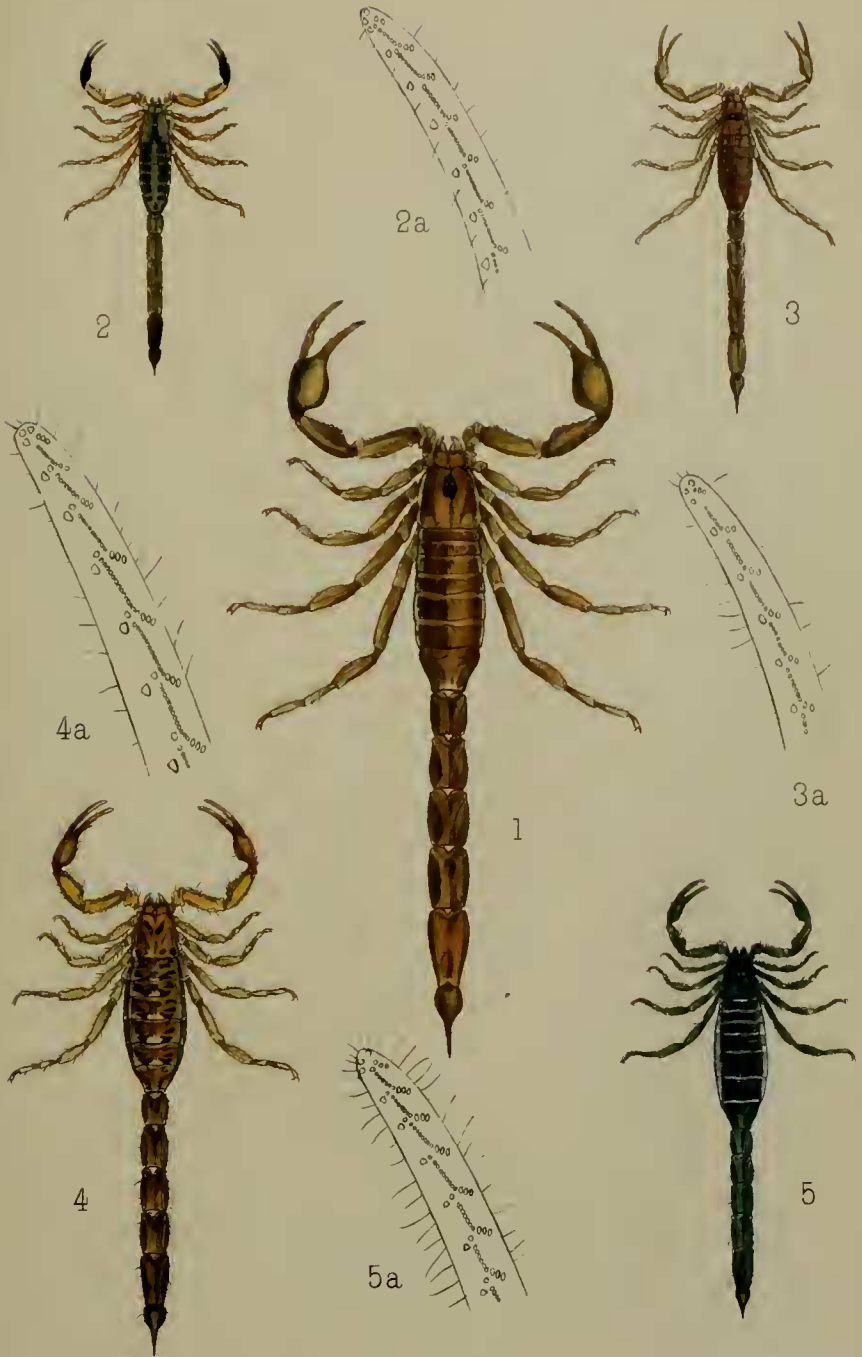
Again, with regard to the foundation of genera, I find that it is impossible to follow Dr. Thorell in the reliance that he placed upon the form of the tail. The genera, however, based upon the armature of the digits of the chelæ appear to me to deserve recognition; but since the form of the tail varies with sex so enormously in many genera, I have decided not to retain *Phassus*, *Rhopalurus*, and *Babycurus*, which were based upon a character merely, to my mind, of specific importance.

And, lastly, in accordance with what appears to me to be the best working system of nomenclature, I have thought it advisable, at the risk of some slight and, let us hope, temporary inconvenience, to alter the names of two of Dr. Thorell's genera and to substitute a new term for one of the genera proposed by Dr. Karsch. In each case reasons are given for the change.

In the accompanying synopsis the genera have been classed under three headings. The first heading, containing *Uroplectes* and *Lepreus*, is unquestionably a natural group: the same may be said of the second—if a possible exception be made of the remarkable form *Butholus*; but I am very doubtful if the third section, namely *Buthus*, can rightly be considered as such. Undoubtedly all the forms contained under it agree in possessing the two inferior teeth on the immovable digit of the chelicerae, but there appears to be no reason why such a character should not have arisen independently in two instances, and thus fail to be a sign of affinity between them. And,



SOUTH AFRICAN BUTHIDÆ



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indeed, there are some grounds for thinking that this may have taken place in the case of *Grosphus* and of *Rhoptrurus*; for the former appears to connect *Lepreus* with *Buthus*, and the latter *Isometrus* with *Buthus*; or, in other words, *Buthus* appears to have arisen from *Lepreus* by way of *Grosphus* and from *Isometrus* by way of *Rhoptrurus*, that is from two independent sources. And if anyone likes to believe that this has taken place, it is difficult to see how the idea can be shown to be wrong. Of course an alternative hypothesis, namely, that *Grosphus* is the ancestor of both *Buthus* and *Lepreus*, at once suggests itself; but in that case it is hard to see why *Lepreus* should have lost the two mandibular teeth, which must surely be of considerable service in the battle for life. Moreover, when we reflect that *Lepreus* agrees with almost all the Scorpionidæ (including provisionally *Vejovis* and *Bothriurus*) in the absence of these teeth, it is hard to believe that it is not a character which has been transmitted to *Lepreus* from some unknown member of this family. In that case we must, it seems to me, account for the resemblance between *Grosphus* and *Lepreus* on the hypothesis that the latter is the ancestor of the former, unless, indeed, we consider that it is the result of what, for want of a better term, may be called accident. However, from whichever side the question be approached, some obstacle presents itself which our knowledge of the affinities of the genera is at present too limited to surmount. For a variety of reasons, however, it seems to me to be perhaps well to regard provisionally *Lepreus* and *Uroplectes* as derived from *Grosphus*; for undoubtedly in most respects these two genera depart widely from a plan which is common to all the others. With the exception of these two and of *Butheolus*, a genus hard to locate, the accompanying pedigree (see p. 128) appears to me to represent fairly well the mutual relationship of the genera and subgenera here recognized. But it must be regarded as merely tentative and in no way as expressing a final opinion.

Considering the Scorpionidæ as a whole and the Buthidæ as a whole, and noting what characters are common to both and what are the average characters of the least specialized of the genera of Buthidæ, we are able to form some opinion as to the characters of the immediate ancestor of the Buthidæ, or, in other words, to discover the common plan from which all the modifications of the various genera can be derived.

By this means it may be inferred that in this hypothetical ancestral form the sternum was triangular; the movable digit of the chelicerae was furnished with three teeth above and two below (not counting the terminal fang), the immovable with a single row of teeth; the armature of the digits of the chelæ was composed of a number of oblique, parallel, slightly overlapping rows of denticles; there were two median eyes, and three lateral eyes on each side; the cephalothorax was granular, but not carinate; the tergites were granular and furnished with a median keel, the last, in addition, bearing two lateral keels; the sternites were smooth and anteriorly bisulcate, the last only being furnished with two or four keels; the tail was keeled throughout, and there was probably a spine beneath the aculeus;

the tibiæ of the two posterior legs were armed with a spur; the pectinal teeth were all alike; the stigmata were slit-like.

This diagnosis agrees more nearly with the plan of *Isometrus* than with that of any other genus, notwithstanding that there is in *Isometrus* a single lower tooth on the immovable digit of the chelicerae. *Isometrus* is cosmopolitan, and in Australia, Africa, and America it appears to have given rise to three distinct genera. In Australia *Isometroides* has sprung up through the loss of the spine beneath the aculeus and by the acquisition of coarse punctulation on the under surface of the fifth caudal segment; in America *Centrurus* originated by the development of short rows of teeth connecting the extremities of the median rows of the digits of the chelæ; in Africa *Buthus* arose when a second inferior tooth appeared behind the first on the immovable digit of the chelicerae. Beyond this stage *Rhoptrurus* has not passed; but *Grosphus* has lost a distinct spine beneath the aculeus, and in the female the basal pectinal tooth has become dilated. *Parabuthus* can be derived from *Grosphus* by a slight modification in the arrangement of the denticles on the chelæ, by the loss of the enlarged pectinal tooth (perhaps through its fusion with the shaft of the pecten), and by an increase in the strength of the tail; whether *Buthus* (s. s.) has been derived by the development of lateral tergal keels from *Parabuthus* or *Grosphus* it is not easy to say; but that *Prionurus* has been developed from *Buthus* by an alteration in the form of the tail will probably not be disputed.

Lepreus resembles *Grosphus* in possessing an enlarged basal pectinal tooth in the female; but whether this genus has been derived from *Grosphus* by the loss of the two lower teeth, and by a modification in the armature of the chelæ, cannot as yet be settled. But inasmuch as the arrangement of the denticles on the chelæ more nearly approaches in *Lepreus* than it does in *Uroplectes* what is met with in *Grosphus* or *Isometrus*, I consider that *Uroplectes* is a descendant of *Lepreus*.

Butheolus is isolated, and may have been derived from either *Buthus* or *Isometrus*.

Before proceeding to a consideration of the genera, it will be well to discuss shortly the armature of the digits of the chelæ and the probable origin of the various modifications that are presented.

Generally speaking, the dentition throughout the family may be described as consisting of a number of oblique, overlapping, parallel rows of fine close-set denticles. On each side of this median series there is a row of larger, more widely separated teeth, and the question to be decided in connection with these lateral teeth is whether they have been derived from the median rows or have arisen independently of them. However, after examining many genera and species of *Scorpionidæ* as well as of *Buthidæ* I am strongly inclined to believe that the lateral teeth have been derived from the median series, and that originally the armature of the chelæ consisted solely of a number of oblique, overlapping, parallel rows of close-set denticles, and that perhaps one or two terminal denticles of each row were larger than the rest. From this relatively simple disposition of

denticles, all the arrangements met with throughout the family are easily derivable. The first modification that presents itself results from the assumption of an obliquely transverse position by the posterior tooth or two posterior teeth of each row. Thus arises the "external series" of Dr. Thorell. The internal series results, I believe, from the separation of the anterior tooth of each series from the rest; this separation is sometimes carried to such an extent that all connection between the tooth and the series from which it arose is lost.

If this view as to the original disposition of the denticles is correct, the arrangement seen in some species of *Isometrus* is that which comes nearest to the primitive plan. Thus in, *e. g.*, *I. messor*¹ the anterior tooth of each series is enlarged, but not isolated, and the posterior tooth has altered its position, so that with that which precedes it it forms a transversely set pair; in *I. insignis* the anterior tooth, although still in the same straight line with the rest of the series, is separated by a measurable interval from it, and in *Lepreus fischeri* the anterior tooth has shifted so much forwards that it is on a level with the anterior end of the row in front of the one from which it originated.

Genus LEPREUS, Thorell.

(Plate XIV. figs. 2-4.)

Lepreus, Thorell, Études Scorp. p. 8.

Hab. S. Africa.

Immovable digit of chelicerae unarmed beneath. The external series of teeth on the chelæ is formed by the bending outwards in a direction nearly at right angles to the axis of the digit of the two or three posterior terminal teeth of the median rows; the internal series by the separation (greater or less, as the case may be) of the anterior terminal tooth.

The cephalothorax is not distinctly keeled; the tergites always have one median keel, and in a few cases two lateral short keels; the caudal keels may be well developed or absent, and there may or may not be a spine beneath the aculeus.

The tibiæ of the two posterior legs are spurred. The basal pectinal tooth in the female is (? always) enlarged.

In the arrangements of the denticles on the chelæ the species of this genus vary considerably. Thus in *L. fischeri*, var. *nigrimanus*, all the teeth of the internal series have moved so far forwards that each is on a level with the anterior extremities of the row distal to the one from which it originated. Whereas, in specimens of *L. occidentalis*, at the proximal end of the digit each of the separated teeth is about equidistant from the anterior end of its original series and from the corresponding end of the series distal to this last; but in the middle and distal half of the digit each tooth moves forward and approaches close to the anterior extremity of the series distal to the one to which

¹ I have no object in selecting this species; it happens to be the first that comes to hand.

it belongs; moreover quite at the distal end of the digit, the secondary apical tooth of the median rows becomes enlarged, slightly separated, and constitutes with the original apical tooth a transversely set pair. Thus in this species we clearly see how the arrangement met with in *Uroplectes* has been brought about.

Genus *UROPLECTES*, Peters.

(Plate XIII. figs. 3-5, and Plate XIV. fig. 5.)

Uroplectes, Peters, Monatsb. Ak. Wiss. Berl. 1862, p. 512—type *ornatus*, Peters.

Tityus, Thorell, Études Scorpiol. p. 8 (1876); not *Tityus*, C. Koch, 1836.

Hab. S. Africa.

This genus is closely allied to the preceding and can only be distinguished from it by the arrangement of the denticles on the chelæ. The denticles of the external series are the same in the two genera, but the internal series is composed, in *Uroplectes*, of a series of pairs of teeth. These appear to have arisen, as, indeed, they have arisen to a less extent in *L. occidentalis*, by the separation of the apical tooth of each median row and by its subsequent approximation to the enlarged and slightly separated tooth which forms the secondary anterior end of the series distal to the one from which the external tooth of each pair originated. It thus comes about that in this genus the internal series appears to have been formed, as has the external series, merely by the outward bending of the anterior termination of the median rows.

Both *Uroplectes* and *Lepreus* are found in S. Africa, and I think there is very little doubt that ultimately, owing to the discovery of intermediate forms, all the species will have to be united into one genus *Uroplectes*.

The genus *Tityus* was established in 1836 by C. Koch upon a S.-American species named *Scorpio bahiensis* by Perty.

Clearly, then, *bahiensis* is the type of the genus *Tityus*; but since this species is referable to *Isometrus* of Ehrenberg, a name which antedates *Tityus*, and since a generic name should never be transferred from its type, it follows that *Tityus* must be a synonym of *Isometrus*. In years subsequent to 1836 and especially in 1845 (*Die Arachniden*, xi.) C. Koch referred many more species to his *Tityus*. One of these, a S.-African form, *T. lineatus*, was selected by Dr. Thorell as the type of his *Tityus*; but since this form differs radically from *T. bahiensis*, it is clear that Dr. Thorell's *Tityus* is not equivalent to *Tityus* as C. Koch originally applied the name. And since this transference of a generic name from one typical species to another¹

¹ I am aware that in the *Ann. Nat. Hist.* 1888, vol. ii. p. 245, in connection with the names *Scorpio*, *Heterometrus*, and *Palamneus*, I was the advocate of another system. But further reflection and wider experience has led me to change the view there set forth: consequently I now think that *palmatus* is and must always be the typical species of *Heterometrus*, and that if *palmatus* be congeneric with *africanus*, then *Heterometrus* must be synonymous with *Scorpio*, and that in no case can the generic name *Heterometrus* be transferred from its type *palmatus* to the second species *spinifer*, which is consequently a *Palamneus*.

is, in my opinion, very much to be deprecated, I have added *Tityus* to the synonyms of *Isometrus*, and have taken Peters's name *Uroplectes* for the species which Thorell called *Tityus*. This, however, I have done on the authority of Dr. Karsch, who in a footnote to his table of genera says that *Uroplectes* is synonymous with *Tityus* in Dr. Thorell's sense of the word. Presumably this statement is made after an examination of the type of *Uroplectes*, namely *U. ornatus*. If this, however, be not so, it will be well to bear in mind that there is nothing in Peters's diagnosis of *ornatus* to show that the species is not referable to *Lepreus*. In that case *Lepreus* will have to rank as a synonym of *Uroplectes*, and a new generic name will have to be established for the species here included under *Uroplectes*, unless the alternative be adopted of considering all the species of *Lepreus* and *Uroplectes* as referable to one genus *Uroplectes*¹.

GENUS ISOMETRUS, Ehrb.

Isometrus, Ehrenberg, Symb. Phys. (Scorpiones), p. 3, pl. i. fig. 3 (1829)—type *filum*=*maculatus* (De Geer).

Tityus, C. Koch, Die Arach. iii. p. 33 (1836)—type *bahiensis* (Perty).

Pilumnus, id. Arach. Syst. p. 38 (1837) (nom. præocc.).

Lychas, id. Die Arach. xii. p. 1 (1845)—type *maculatus* (De Geer).

Atreus, Gerv. Apt. iii. p. 52 (1844) (in part), not of C. Koch, 1837,

Centrurus, Peters, Monatsb. Ak. Wiss. Berlin, 1862, p. 512 (in part).

Isometrus, Thorell, Etudes Scorp. p. 9 (1876) (and subsequent authors).

Phassus, id. *ibid.*

Androcottus, Karsch, Mitth. Münch. ent. Ver. p. 11 (1879).

Hab. Tropical countries.

Inferior border of the immovable digit of the chelicerae armed with a single tooth.

The external series of teeth on the digits of the chelæ formed by the assumption of a more or less transverse position of the posterior one or two enlarged teeth of the median rows; the internal series of teeth formed by the enlargement and separation of the anterior tooth of each of the median rows; but this separation is never carried to any great extent. In most of the Old-World species the median rows scarcely overlap each other; but in the larger American forms, such as *I. androcottoides*, the rows overlap to such a degree that the anterior extremity of any one reaches the middle of the row in front of it.

The cephalothorax is usually without well-developed keels; the tergites are nearly always provided only with a median keel; the tail is, as a rule, keeled above and below, and the vesicle is nearly always provided with a strong spine beneath the aculeus.

The sexes generally differ considerably and in a variety of ways: thus the male of *I. messor* and of *I. maculatus* has long chelæ with slender hands and a long tail; *I. tricarinatus* has short chelæ with thick hands and a long tail; *I. mucronatus* (*varius*) has a thick hand

¹ I have refrained from definitely uniting the two genera, because *pilosus* the type of *Lepreus*, is unknown to me.

with the digits widely separated at the base, but with the tail almost unchanged; *I. americanus* has a thick hand with fingers widely separated at the base, and with the tail enormously dilated towards its distal end. The basal tooth of the pectines is never enlarged; but in the female of several of the American forms, such as *I. americanus*, *I. androcottoides*, and *I. insignis*, there is, at the base of the pecten, a distinct rounded lobe projecting over the basal tooth.

Isometrus, so far as geographical distribution is concerned, appears to be the dominant genus of the family, and, as might be expected from its wide range, it varies greatly in structure. Yet in the sum of its characters it appears to come nearest to the ancestral form; for from it by slight modifications most of the genera of the family can be derived. Thus in Australia it appears to have given rise to *Isometroides*, in America to *Centrurus*, in Africa to *Butheolus* and *Rhoptrurus*, the latter genus leading on towards *Buthus*.

Reasons¹ have already been given for regarding the genus *Phassus* as synonymous with *Isometrus*, on the ground that it was based upon a character belonging to the male of a certain species of this last-named genus.

With regard to *Androcottus* it may be said that there is nothing in the diagnosis to warrant the separation of the type as a genus distinct from *Isometrus*. The fusion of the inferior keels on the second, third, and fourth caudal segments, the character upon which it was founded, exists, although apparently to a slightly less extent, in *I. androcottoides*, and varies considerably within the limits of the species.

GENUS ISOMETROIDES, Keys.

Isometroides, Keyserling, Arachn. Austral., Scorpiones, p. 16, pl. ii. figs. 3 & 4 (1885).

Hab. Australia.

A genus closely allied to *Isometrus*, differing, in fact, only in the form of the tail, the vesicle being very slender and without a spine beneath the aculeus, and the fifth caudal segment being deeply punctured and without keels on its under surface.

Two species only have been made known, both being figured and described in the above-cited work. Of one of these species, *I. vescus*, the British Museum possesses a single specimen, from Port Lincoln.

GENUS CENTRURUS.

Centrurus (Hemp. and Ehrb.), Thorell, Études Scorp. p. 9.

Rhopalurus, id. ibid.

Hab. America.

This genus differs from *Isometrus* only in the armature of the digits of the chelæ, the space between the large lateral teeth on each side being occupied by a small row of smaller teeth arranged slightly obliquely, although, roughly speaking, parallel to the long axis of the digit.

¹ Ann. Nat. Hist. (6) iii. p. 55 (1889).

The genus is common in America, and appears to have been derived from the American species of *Isometrus*; since all the specimens of *Centrurus* that I have examined agree with all the American species of *Isometrus*, and differ from all the Buthidæ of the Old World¹, in possessing no spur at the extremity of the tibial segments in the last two pairs of legs.

The male may generally be recognized by having a much longer tail than the female. I look upon *Rhopalurus* as synonymous with *Centrurus* for the same reasons that have led me to consider *Phassus* as a synonym of *Isometrus*. The type of the genus, *R. laticauda*, of which the Museum possesses examples of both sexes from Brazil and Colombia, does not appear to me to be other than a well-marked species of *Centrurus*, standing in almost exactly the same relation to *C. biaculeatus* as *I. americanus* to *I. androcottoides*. So that if *I. americanus* be congeneric, as will hardly be disputed, with *I. androcottoides*, then must *R. laticauda* be congeneric with *C. biaculeatus*.

GENUS BUTHEOLUS, Simon.

Orthodactylus, Karsch, Berl. ent. Zeits. xxv. p. 90 (1881) (nom. præocc.)².

Butheolus, Simon, Ann. Mus. Genov. xviii. p. 258 (1882).

Hab. Mediterranean district of Palæarctic Region.

This is a genus of very doubtful affinities and is correspondingly hard to locate, inasmuch as it appears to partake of the characters of *Isometrus*, *Isometroides*, and *Buthus*. In his diagnosis of it M. Simon says that the inferior border of both the movable and immovable digits of the chelicerae are furnished with only one tooth; but this is by no means always the case, for in one of the specimens of *B. melanurus*³ preserved in the National Museum there are the normal number, namely, two teeth on this edge in the movable digit and also, which is a significant fact, two teeth on the corresponding edge in the immovable digit as in *Buthus*. This, although probably an abnormal development, serves to lessen considerably the hiatus between *Isometrus* and *Buthus*, and to diminish the systematic value that has been placed upon the presence or absence of these teeth. The features in which this genus resembles *Isometroides*, namely the slender and unarmed vesicle, the punctured keelless fifth caudal segment, and the feeble chelæ, are, considering the distribution of the two, in all probability not due to affinity between the genera, but have arisen independently in the two localities. *Isometroides* is much more nearly related to *Isometrus* than is *Butheolus*; the latter may be distinguished from both by the form of the cephalothorax, which is much sloped in front of the eyes and has a convex anterior border.

The arrangement of denticles on the digits of the chelæ is very simple in *B. melanurus*³; in the proximal half of the digit the median

¹ With the exception of *I. assamensis*, *melanophylla*, and the cosmopolitan *I. maculatus*.

² Vide Simon, Verh. z.-b. Ges. Wien, xxxix. 1889, p. 386.

³ Kessler, Trudui Russkago Entomol. viii. (1876), p. 16, pl. i. figs. 1-3 (= *schneideri*, L. Koch, &c.).

denticles are arranged in a long simple longitudinal series, which only in the distal half divides into a number of oblique short rows; the internal series consists of enlarged teeth set singly and at a distance from the series from which they arose: the external teeth of the external series are also arranged in a single row, the individual teeth being close to the median series and alternating with, but not forming a transverse line with, those of the internal series.

The genus is further remarkable for the great size of the tail.

Genus BUTHUS, Leach.

Buthus (Leach), Thorell, Études Scorp. p. 8—type *europæus* (Linn.).

This genus is unknown in America and Australia, but, including all the subgenera here admitted, is widely distributed elsewhere, being especially abundant in Africa and the Mediterranean district.

Subgenus RHOPTRURUS, Karsch.

(Plate XIII. figs. 1, 2, and Plate XIV. fig. 1.)

Odonturus, Karsch, Sitz. Ges. nat. Fr. 1879, p. 119 (nom. præocc.).

Rhoptrurus, id., Berl. ent. Zeits. xxx. p. 77 (1886).

Babycurus, id. ibid.

Hab. S. Africa, Madagascar.

Movable digit of chelicerae with two teeth on the inferior border.

In the digits of the chelæ the posterior ends of the median rows of denticles are not enlarged, but are bent outwards, thus constituting the external series; the internal series is formed by the enlarged and slightly separated anterior tooth of each median row. The cephalothorax is not keeled; the tergites have one median keel.

The tail is powerful or moderate, strongly keeled or almost without keels; there is a spine beneath the aculeus.

The pectinal teeth are all alike.

The sexes may differ in many ways, as in *Isometrus*; thus the ♂ of *R. kirki* has a widened tail, a widened hand, and a space between the base of the digits; in *R. baronii* the pectines of the ♂ are much larger than in the ♀.

Of all the subgenera of *Buthus* this one comes nearest to *Isometrus*, uniting *Isometrus* with *Parabuthus*. From *Isometrus* it may be distinguished by the dentition of the chelicerae, and from *Parabuthus* by the spine beneath the sting, the much less strongly dentate or granular tail, and by the arrangement of the denticles on the digits of the chelæ. The genus *Babycurus* was separated from *Rhoptrurus* on the strength of the greater slenderness of the tail; but since this is merely a sexual character belonging to the female, the genus cannot well be retained.

This genus contains the following species:—

R. dentatus, Karsch (under *Odonturus*), Sitz. Ges. nat. Fr. Berlin, 1879, p. 119; Mombas.

R. büttneri, id. (under *Babycurus*), Berl. ent. Zeits. xxx. p. 78, pl. iii. fig. 1 (1886); Gaboon.

R. centrurimorphus, id. ibid. fig. 2; Madagascar; and the three species described below (pp. 137–141).

Subgenus *GROSPHUS*, Simon.

Grosphus, Simon, Ann. Soc. Ent. Fr. (5) x. p. 378 (1880).

Hab. Madagascar.

This genus was established upon certain characters observed in the type specimen of *Andr. madagascariensis*, Gervais. These characters were (1) a single tooth on the inferior border of the movable digit of the chelicerae, and (2) the enlargement of the basal pectinal tooth. At the time M. Simon probably was not aware that the latter character is sexual and, consequently, by itself, is not of generic importance. The first character, certainly, if proved to be constant in a number of individuals, would be unquestionably of generic value; but the fact that this very character has been noticed as an abnormality in *Buthecolus*, and, moreover, that three other species¹ obviously very closely allied to *madagascariensis*, and inhabiting the same area, present the normal armature of this segment of the chelicerae, have led me to conclude that the absence of the second tooth is merely an individual variation. But since these species, with *madagascariensis*, appear to me to constitute a natural and, at all events, subgenerically distinct group, I have retained the name *Grosphus* for them and have made the necessary alterations in the definition of the subgenus.

It may be characterized as follows:—

Denticles on the digits of the chelæ as in *Rhoptrurus*. Inferior border of the movable digit of the chelicerae with one or two teeth.

Basal pectinal tooth in ♀ the largest of the series. Tergites with a median keel; cephalothorax without keels.

Tail moderate; not strongly and granularly keeled; with or without a spine beneath the aculeus.

As *Rhoptrurus* appears to connect *Isometrurus* and *Parabuthus*, so does *Grosphus* connect *Lepreus* with *Parabuthus*. It differs from *Lepreus* in the armature of the chelicerae and in the disposition of the internal series of teeth on the digits of the chelæ, but appears to be allied to it in having an enlarged basal pectinal tooth. Whether or not this last character is a sign of affinity between the two it seems to me impossible at present to say.

The following are the species I refer to this subgenus:—

G. madagascariensis, Gervais (under *Androctonus*), Arch. Mus. iv. p. 213, pl. xi. figs. 1–3 (1839); Simon, Ann. Soc. Ent. Fr. (5) x. p. 377 (1880).

G. limbatus, Pocock (under *Buthus*), Ann. Nat. Hist. (6), iii. p. 346 (1889).

G. piceus, id. t. c. p. 349.

G. lobidens, id. t. c. p. 461.

All are from Madagascar.

¹ *Buthus limbatus*, *B. piceus*, Pocock, Ann. N. H. (6) iii. p. 346 *B. lobidens*, id. t. c. p. 461.

Subgenus PARABUTHUS, NOV.

Prionurus, Ehrenberg (in part); Karsch (in part).

Type, *P. liosoma* (Ehrb.), Symb. Phys. no. 10, pl. ii. fig. 6.

Hab. Ethiopian Region.

Ehrenberg included in his group *Prionurus* a species named *liosoma* which departs sufficiently widely from the type *P. funestus* to be worthy of special recognition. Dr. Karsch was the first to point out this fact; but in attempting to establish a separate genus of which *liosoma* was to be the type, this author appears to me to have fallen into error in two particulars. In the first place, since Thorell had restricted *Androctonus* to those Scorpions which were termed *Prionurus* by Ehrenberg—a proceeding justifiable on the grounds that no type had been named for *Androctonus* and that a genus must supersede its subgenus—it is clear that the type of *Prionurus*, namely *funestus*, is also the type of *Androctonus* and that *Prionurus* must, in that case, be regarded as a synonym of *Androctonus*. But Dr. Karsch, wishing to preserve the term *Prionurus*, selected as the type Ehrenberg's species *liosoma*, on the understanding that *liosoma* is generically, or at all events subgenerically, distinct from *funestus*. But, as stated above, it seems to me to be absolutely essential to select as the type of a genus the species which is the first referred to it by the author—unless any other be specially mentioned by him as typical—and never to transfer this generic term from this species and its allies to another, which differs from the type in generic characters, although this other was referred originally to the same genus. Consequently I hold that *funestus* is the type of *Prionurus*, and that the transference of the name to *liosoma* can only lead to confusion.

I have therefore found it necessary to create a new subgeneric name for *liosoma* and its allies, since the group appears to me to be a perfectly natural one, agreeing both in important characters and in geographical distribution.

But the group as characterized by Dr. Karsch cannot stand, inasmuch as it was based upon a character—the presence of a median lateral keel on the fourth caudal segment—which may or may not exist within the limits of a single species, and is valueless for generic distinction. Moreover, as thus defined the genus is quite an unnatural group, inasmuch as it includes forms, such as e. g. *liosoma* and *pelopponensis* (*gibbosus*), which are widely separated from each other, and in addition completely severs *pelopponensis* from its nearest allies—*europæus*, *leptocheles*, &c.

The subgenus may be characterized thus:—

On the digits of the chelæ the external series of teeth are formed by the enlargement and partial assumption of a lateral position of the two posterior teeth of the median rows; the internal series by the enlargement and separation of the anterior tooth of each median row. The cephalothorax is not costate, and the tergites are furnished with only a median keel. The tail is powerful and strongly keeled, but there is a marked tendency to obliteration on the part of

the inferior keels on the posterior segments; the vesicle and aculeus are large and there is no spine beneath the aculeus.

The pectines are armed with many teeth, which are all alike in both sexes; and the sternum is reduced to a minimum, being smaller than in any of the genera hitherto considered.

The males have a wider hand than the females; and the females of most of the species may be recognized by the possession of a remarkable internal lobate dilatation of the base of the pectines. This dilatation, although it appears to belong to the shaft of the pecten, results, I am now inclined to think, from the fusion of the enlarged basal tooth with the sclerite that supported it. If this be so, the character can be directly derived from what is seen in *Grosphus*, where the tooth is enlarged but still free, and it unmistakably points to *Grosphus* as the ancestor of *Parabuthus*.

The Museum possesses examples of the following representatives of this subgenus:—

P. liosoma, Ehrb. Symb. Phys. no. 10.

P. villosus, Peters, Monatsb. Ak. Wiss. Berlin, 1862, p. 26; Thorell, Études Scorp. p. 29.

*P. plicicauda*¹, Pocock, Ann. Nat. Hist. (6) iii. p. 344 (1889).

P. brevimanus, Thorell, op. cit. p. 36.

P. fulvipes, Simon, Ann. Soc. Ent. Fr. vii. p. 378 (1888).

Subgenus BUTHUS, s. s.

Buthus, Leach, Trans. Linn. Soc. xi. p. 391 (1815)—type *occitanus* (= *europæus*, Linn.).

Androctonus (*Leiurus*), Hempr. & Ehrb. Verh. nat. Fr. Berlin, i. p. 352 (1829)—type *tunetanus* (= *europæus*, Linn.).

Hab. The Old World, except Australia.

The denticles on the digits of the chela very much resemble in arrangement those of *Parabuthus*; but in the majority of cases the teeth of the internal series appear to have taken up a more forward position, so that they alternate with the teeth of the external series and do not form with them oblique short rows.

The cephalothorax is (? always) furnished with symmetrically placed granular keels, and the tergites with at least three granular keels. The tail is moderately powerful; there is no spine beneath the aculeus, and the upper sides of the fifth caudal segment are rounded and not compressed and carinate.

The pectines are long, all the teeth are alike, and there are no noticeable sexual variations in these organs. The 'manus' of the male may be wider than in the female and the dactyli may be more lobate and sinuate, but generally speaking the sexes are hard to recognize.

This subgenus contains more species than any other genus or subgenus of the family. These species are found principally in the countries bordering the Mediterranean; but from thence they spread southwards along the west and east coasts of Africa to the Cape of Good Hope, and eastwards through Persia and Afghanistan to Peking

¹ ? = *capensis* (Ehrb.)

and Singapore. But beyond these limits no species have been recorded¹.

By the form of the tail the species have been, and may be, divided into two sections. The first is composed of those in which the fifth caudal segment is posteriorly excavated above, and has its infero-lateral keels weakly and uniformly denticulate throughout. Of this group the Museum possesses examples of the following:—*B. hottentota* (Fabr.), W. Africa; *B. minax*, L. Koch, Egypt (= ? *acutecarinatus*, Simon); *B. eminii*, Pocock, E. Africa; *B. socotrensis*, Pocock, Socotra; *B. judaicus*, Simon, Syria; and *B. martensii*, Karsch, India. To the second section, comprising those forms in which the fifth caudal segment is but slightly, if at all, excavated above posteriorly and in which its inferior keels are irregularly and as a rule strongly denticulate, are to be referred a great number of species, which seem to be more highly specialized than those in the first category.

Subgenus PRIONURUS, Ehrb.

Prionurus, Hempr. & Ehrenb. Verh. nat. Fr. Berlin, i. p. 356 (1829)—type *funestus* (= *australis*, Linn.).

Prionurus, Peters, Monatsb. Ak. Wiss. Berlin, 1862, p. 513—type *funestus* (= *australis*, Linn.).

Androctonus, Thorell, Études Scorpionol.—type *australis* (Linn.).

Not *Prionurus*, Karsch, Berl. ent. Zeitschr. xxx. (1886) p. 77.

Hab. N. Africa and Syria.

This subgenus is closely allied to the preceding, and differs merely in having the lateral margins of the upper surface of the fifth caudal segment compressed and carinate, instead of rounded. The tail is always strong, sometimes exceedingly powerful.

It is not quite clear as to what is to be the name for this group.

In his work on the Scorpions Ehrenberg constituted the genus *Androctonus*; and without definitely naming a type species divided the genus into two subgenera. The first of these—the small-tailed forms—he named *Leiurus*, with the type *tunetanus* or *quinque-striatus*; to the second or thick-tailed forms he gave the name *Prionurus*, with the type *funestus*. When Peters revised the group he concluded that the two sections should constitute genera; consequently he abolished *Androctonus*, apparently because it was without a type species; made, and rightly, *Leiurus* a synonym of *Buthus*, but preserved *Prionurus* as a genus in almost the sense in which the name was used by Ehrenberg. But Dr. Thorell, recognizing that the name *Androctonus* must take precedence of either one or other of its subgenera and that a type must consequently be fixed upon for it, decided to upset Peters's arrangement and to substitute *Androctonus* for his *Prionurus*.

But according to the system which has been followed, as far as possible, throughout this paper—that is, the system of selecting the first species mentioned under a genus as the type of the genus, when no other is specified—the type of *Androctonus* is *tunetanus*. But

¹ *Androctonus variegatus*, Gerv., from New Ireland, is in all probability an *Isometrus*.

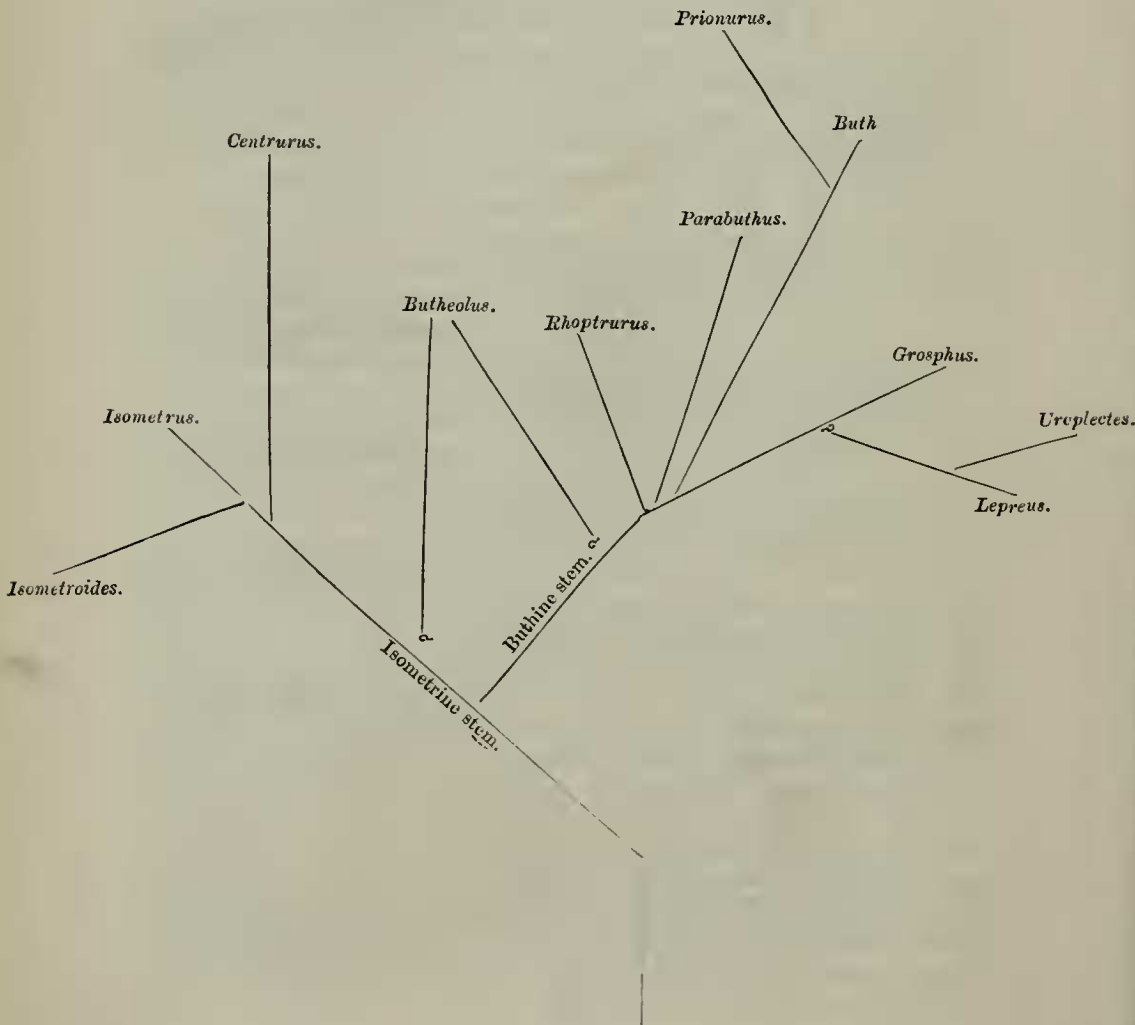
since this species is also the type of *Leiurus* it follows that *Leiurus*, the subgenus, must give place to *Androctonus*. But *europæus*, the type of *Buthus*, is recognized as synonymous with *tunetanus*, and *Buthus* antedates *Androctonus* by 14 years: therefore *Androctonus* must be a synonym of *Buthus*. *Prionurus* can then be used to include those powerful-tailed species of which *australis* is the type—that is, in the sense in which Ehrenberg presumably meant it to be used, and in the sense in which Peters himself employed it.

Synopsis of the Buthidæ.

- a. The inferior border of the immovable digit of the chelicerae unarmed.
- a¹. The lateral-internal series of denticles on the digits of the chelæ composed of transversely set pairs of teeth UROPLECTES, Peters.
Type *U. ornatus*, Peters.
- b¹. The lateral-internal series of denticles on the digits of the chelæ composed of a row of teeth widely separated and set singly LEPREUS, Thor.
Type *L. pilosus*, Thor.
- b. The inferior border of the immovable digit of the chelicerae armed with one tooth.
- a². The intervals between the main teeth of the lateral series on the digits of the chelæ not occupied by smaller teeth.
- a³. Ante-ocular portion of cephalothorax horizontal, with lightly emarginate anterior border.
- a⁴. With a spine or tubercle beneath the aculeus; fifth caudal segment not coarsely punctured, and normally keeled beneath..... ISOMETRUS (Ehrb.), Thorell.
Type *maculatus* (De Geer).
- b⁴. Without a spine or tubercle beneath the aculeus; fifth caudal segment not keeled beneath and adorned with large punctures ISOMETROIDES, Keys.
Type *I. vcsus* (Karsch).
- b³. Ante-ocular portion of cephalothorax sloped forwards, with its anterior margin convex; tail very powerful..... BUTHEOLUS, Simon.
Type *B. thalassinus*, Simon.
- b². The intervals between the main teeth of the lateral series on the digits of the chelæ occupied by a single row of smaller teeth; the rest as in *Isometrus* CENTRURUS (Ehrb.), Peters.
Type *C. gracilis* (Latr.).
- c. The inferior border of the immovable digit of the chelicerae armed with two teeth BUTHUS, Leach.
Type *B. europæus* (Linn.).
- c¹. Tergites with a single median longitudinal keel; cephalothorax without distinct keels.
- c². All the pectinal teeth alike in both sexes; tail moderate or powerful; the segments moderately strongly keeled; a distinct spine beneath the aculeus Subgenus RHOPTRURUS, Karsch.
Type *R. dentatus*, Karsch.
- c². The basal pectinal tooth dilated in the female; tail moderate, not strongly keeled;

- vesicle either with or without a tubercle beneath the aculeus..... Subgenus **GROSPHUS**, Simon.
Type *G. madagascariensis* (Gerv.).
- e*². The basal pectinal tooth in the female like the rest; tail powerful and as a rule strongly keeled; without a spine or tubercle beneath the aculeus..... Subgenus **PARABUTHUS**, n.
Type *P. liosoma* (Ehrb.).
- d*¹. Tergites with a single median and two lateral keels; cephalothorax, as a rule, distinctly keeled.
- f*¹. Fifth caudal segment with rounded supero-lateral edges Subgenus **BUTHIUS** (s. s.).
Type *B. europæus* (Linn.).
- g*¹. Fifth caudal segment with compressed carinate supero-lateral edges Subgenus **PRIONURUS** (Ehrb.).
Type *P. australis* (Linn.).

Hypothetical Pedigree of the Buthidæ.



Descriptions of new or little-known Species.

LEPREUS CARINATUS, sp. n. (Plate XIV. fig. 3.)

Colour (dry specimen) almost uniformly dark ochraceous, the ocular tubercle and the anterior border of the cephalothorax black.

Cephalothorax thickly and somewhat coarsely granular throughout, without trace of keels; its anterior border lightly emarginate; the ocular tubercle deeply and widely cleft, granular in front and behind, smooth in the middle; the post-ocular sulcus deep and T-shaped.

Tergites closely granular throughout, the granulation coarser in the posterior half; the first six furnished with a conspicuous median granular keel; the fourth, fifth, and sixth, in addition, with traces of short lateral keels, formed of two or three large granules set in longitudinal series; the seventh tergite furnished with an anterior median, granular, subcarinate prominence, and two lateral, long, conspicuously denticulated keels, which behind almost attain the posterior margin, and in front are more or less connected by a transverse row of stronger granules.

Sternites: the first four smooth, sparsely punctured and bisulcate; the fifth furnished with four obsolete, subgranular keels.

Tail long and nearly parallel-sided; the first four segments hollowed above and minutely granular; the first three furnished with ten keels, the fourth with eight; the superior keels on the first four denticulate, with the posterior denticle the largest; the superior lateral keel on these same segments also denticulate, but with the terminal denticle only enlarged on the first and second; the median lateral keel is also denticulate, but less strongly than those just described—it is complete on the first segment, slightly abbreviated in front on the second, and slightly more abbreviated on the third, on the fourth its position is occupied by a few small granules; the inferior keels are strong and denticulated on the first four segments, but a little less strongly denticulated on the first than on the second, on the second than on the third, and on the third than on the fourth: the fifth segment minutely and closely granular and shallowly excavated above, with no conspicuous posterior depression and no superior keels, laterally more coarsely granular; the three inferior keels strong and complete and evenly denticulated throughout; the spaces between these keels furnished with strong granules, which in the anterior half of the segment are on each side of the middle line arranged in a definite longitudinal series. *Vesicle* of moderate size, sparsely but distinctly tubercular beneath, without a spine or enlarged tubercle beneath the aculeus, which is of moderate length and gently curved.

Palpi distinctly hairy, especially on the brachium, manus, and dactyli; *humerus* finely granular above and below, tubercular in front, the keels normal, distinct and strongly granular; *brachium* not costate, rounded and smooth behind and below, granular above, granular and tubercular in front; *manus* rounded, neither carinate nor granular, slightly wider than the brachium; *dactyli* short, both slightly sinuate; the armature of the dactyli closely resembling that

of *Parabuthus*, the external series being composed of pairs of teeth, enlarged and set obliquely, the internal series formed of single teeth only slightly separated from the apices of the median rows, and constituting with the teeth of the external series oblique, semi-transverse, short rows; the median rows not overlapping.

Legs hairy; the first pair almost without granules, the second slightly granular, the third with granular and subcarinate femur and granular patella, the fourth with strongly granular and subcarinate femur and patella; *tibiae* of two posterior pairs spurred; *coxae* smooth.

Pectines very long, projecting nearly to the end of the trochanter of the fourth pair of legs; furnished with from 24–27 similar teeth.

Measurements in millimetres.—Total length 34; length and width of cephalothorax 4; length of tail 22; of first two segments 6·5; of fifth segment 4·6; width of first 2·5; of fifth 2·1: humerus, length 3·5, of brachium 4; width of brachium 1·5, of manus 1·9; length of “hand-back” 2·8; of movable dactylus 4.

A single male specimen in the Museum collection ticketed “S. Africa, near the tropic of Capricorn.”

This species is closely allied to *L. pilosus*, Thorell (the type of the genus), to *L. lunulifer*, Simon, and to *L. planimanus*, Karsch.

From *L. pilosus* it differs in having the inferior caudal keels well developed and denticulate; from *L. lunulifer* it may be recognized by its tubercular vesicle, granular legs, and by its subcostate and subgranular posterior abdominal sternite; and from *L. planimanus* by the form of its lateral tergal keels, by the presence of ten keels on the third caudal segment, and by its narrower hand.

Peters's species *Centrurus trilineatus* (Monats. Ak. Wiss. Berlin, 1862, p. 515), from Tette, is too briefly characterized to be identified; but it probably belongs to this genus and may, indeed, prove to be synonymous with either of the four species here discussed.

LEPREUS FISCHERI, Karsch, var. nov. NIGRIMANUS. (Plate XIV. fig. 2.)

? *Tityus tricolor*, Simon, Bull. Soc. Ent. Belg. 1882, p. lix.

Colour. Trunk above olivaceous, of a dull green colour, the sides of the cephalothorax paler than the middle; each of the first six tergites marked with three pale spots—one median, and one on each side near the lateral posterior angle; seventh tergite paler than the preceding; trunk below olivaceo-testaceous; upper surface of first four caudal segments ochraceo-testaceous, the under surface of the same colour, but on the second, third, and fourth there is an anterior black spot on each side and a median black posteriorly dilating band; fifth segment and the vesicle wholly piceous or brunneous; aculeus black at the tip, pale at the base; humerus, brachium, and distal half of digits clear ochraceous; manus and proximal half of digits piceous; legs wholly pale ochraceous.

Cephalothorax lightly emarginate in front; ocular tubercle with ante-ocular portion smooth; posterior and lateral portions finely and sparsely granular.

Tergites almost wholly smooth; the sixth bearing a few minute scattered granules, the seventh somewhat closely but finely granular; each of the first six furnished with a smooth median keel, the seventh with a low anterior median elevation, and two lateral almost obsolete granular keels.

Sternites wholly smooth, sparsely punctured, obsoletely bisulcate.

Tail wholly without keels; the first four segments shallowly excavated above and feebly granular; the first three furnished posteriorly on each side with two large granules which mark the positions of the terminations of the keels that have disappeared; on the first segment the superior keel is further represented by one or two granules *anterior* to the terminal one; on the other segments each superior keel is represented by a row of punctures; upper surface of the fifth posteriorly hollowed; under surface of the segments conspicuously but somewhat sparsely punctured. *Vesicle* punctured beneath, with a tuft of setæ above and another round the large spine which is situated beneath the aculeus; aculeus stout and considerably curved.

Palpi: *humerus* almost wholly smooth; the positions of the normal carinæ marked by a few granules and setiferous pores; *brachium* sparsely and weakly granular in front, rounded, smooth and punctured elsewhere; *manus* narrow, sparsely punctured, sparsely granular in front; *digits* long and curved, in contact throughout their extent; the internal series of teeth widely separated from the median rows.

Legs almost entirely smooth, not carinate.

Pectines projecting slightly beyond the fourth coxæ; furnished with 18 teeth, of which the basal is much dilated.

Measurements in millimetres.—Total length 29; cephalothorax, length and width 3·5; length of tail 18; of 1st two segments 5; of 5th 3·5; humerus, length 3; brachium, length 3·5, width 1·5; manus, width 1·3; length of "hand-back" 1; of movable digit 4.

A single female, probably immature, specimen in the Museum, collected at Mombassa by Mr. Grose Smith.

Very closely allied to the typical form of *L. fischeri*, Karsch, from Barawa (Somali). This species is unknown to me, but the description of it fails in a number of particulars to apply to the specimen here named. These particulars, although of small importance when considered separately, constitute in the aggregate a sufficiently wide distinction to justify the separation of this specimen as the type of a new variety.

Thus the cephalothorax of *L. fischeri* is said to be adorned with two oblique yellow bands which meet at an angle in the middle line; these bands are not observable in *L. nigrimanus*: the upper surface of the abdomen in *L. fischeri* is said to be adorned with a median wide yellow band, no mention being made of lateral spots; in *L. nigrimanus* this band is not complete, nor would it be wide if it were so, for the median spots exist only on the posterior half of the tergites and are narrow; moreover there are very conspicuous lateral

spots: the fourth caudal segment of *L. fischeri* is described as being infuscate; in *L. nigrimanus* it closely resembles the second and third segments in presenting an inferior median fuscous band and two antero-lateral fuscous spots: the band in *L. fischeri* is furnished with blackish lines; in *L. nigrimanus* it is wholly fuscous: in *L. fischeri* the general tint is "flavo-fuscus"; in *L. nigrimanus* it is olivaceous: and lastly the seventh tergite in *L. fischeri* is furnished with only a median keel, whereas in *L. nigrimanus* the two lateral keels in each side are distinct although not well developed.

It must be borne in mind, however, that specimens of the typical *L. fischeri* have been recorded by Dr. Karsch from Madagascar as well as from Barawa. Consequently on account of the wide range of this species it is quite likely that fresh collections will show that the characters here relied upon are too unstable to be even of varietal importance.

In the Ann. Soc. Ent. Fr. (5) x. p. 397, M. Simon expresses an opinion that his species, *Lepreus occidentalis*¹ (Plate XIV. fig. 4), may be synonymous with *L. fischeri*, Karsch. But judging from the series of *occidentalis* that the Museum possesses—namely two from the Gaboon, six from Angola, and two from the Congo—the two species are distinct, although very closely allied; *occidentalis* may be at once recognized by the presence on the under surface of the tail of three fuscous bands, whereof the lateral are bifid in front; in *fischeri* there is a single median band and two anterior spots.

UROPLECTES INSIGNIS, sp. n. (Plate XIII. fig 4.)

Colour variegated, testaceous and fuscous, the latter predominating; the tubercle and ante-ocular area infuscate, the posterior and lateral portions of the cephalothorax variegated; tergites with a testaceous stripe close to each side margin, a V-shaped testaceous mark nearer the centre, and a large yellow median patch which behind is divided by a black streak covering the median keel; upper surface of caudal segments infuscate in the middle, testaceous at the sides, lateral and inferior surface of the anterior segments adorned with black lines; inferior surface of the fifth almost wholly black; vesicle banded with yellow. *Humerus* and *brachium* infuscate above, manus lined and reticulated with black; dactyli infuscate at the base; *femora* with a black line along the lower margin, *patellæ* testaceous in the middle, *tibiæ* and *tarsi* with a patch of black at their proximal ends; under surface almost wholly testaceous, the last tergite with a conspicuous black band on each side.

Cephalothorax somewhat coarsely, but sparsely, granular; the ocular tubercle wholly smooth.

Tergites nearly smooth in front, coarsely and sparsely granular posteriorly; the first six furnished with an abbreviated smooth keel; the last with two coarsely granular keels on each side and a median nearly smooth prominence in its anterior half.

Sternites wholly smooth throughout, very sparsely hairy.

¹ ? Syn. *Tityus chinchoxensis*, Karsch, Zeitschr. ges. Naturw. 1879, p. 370.

Tail robust, somewhat widely and deeply excavated above, the sides of the excavation with a few granules, which in the fourth and anterior part of the fifth segment form a series parallel to the superior keel; superior keels strongly developed and coarsely granular, the terminal granule, except in the fifth, taking the form of a large tooth; the fifth segment deeply depressed behind, the superior keel evenly granular throughout; the superior lateral keel weakly granular, well developed in the first segment, becomes progressively weaker from before backwards, being wholly absent on the fourth; inferior surface of the first and second segments wholly smooth, without keels, but marked with serially arranged setiferous pores; lateral surfaces of the third sparsely and coarsely granular, keelless, inferior surface also keelless and almost smooth; inferior and lateral surfaces of the fourth segment somewhat coarsely granular, but without keels; inferior and lateral surfaces of the fifth coarsely and somewhat thickly granular, especially in its posterior half. *Vesicle* coarsely and subserially granular beneath and sparsely hirsute, smooth above and furnished with a median tuft of setæ; subaculear spine small and blunt.

Palpi beset with setiferous pores; upper surface of *humerus* smooth except for the granular keels which define it in front and behind; posterior and anterior surface bearing longer and smaller tubercles; inferior surface smooth; *brachium* bearing a few granules and tubercles above in front, the rest smooth and rounded and without keels; *manus* rounded, slightly wider than the brachium, neither keeled nor granular; without a spine; *dactyli* of moderate length, curved, in contact throughout, neither lobate nor sinuate; the armature in the proximal third of the dactylus resembles that supposed to be characteristic of *Lepreus*, inasmuch as the inner series is composed of isolated denticles; in the distal half, however, owing to the increase in size and partial separation of the apical or two apical denticles of the median rows and their approximation to the denticles of the internal lateral series, the arrangement is that of *Tityus* as restricted by Dr. Thorell.

Legs almost smooth; *femora* feebly granular along their upper and under edges; *tibiæ* of the two posterior pairs spurred; *coxæ* smooth.

Pectines short, bearing from 15–17 teeth, whereof the basal is much enlarged, although of much the same shape as, and not projecting beyond the line of, the rest.

Stigmata very small, slit-like.

Two female specimens from Table Mountain, collected by Dr. G. E. Dobson.

Measurements in millimetres.—Total length 39; cephalothorax, length and width 4; length of tail 20·2; of 1st two segments 5·2; of fifth segment 4·2; width of first segment 2·7; of fifth 2·5; length of vesicle and aculeus 5; humerus length 3·7; brachium length 4·5, width 2; width of manus 2; length of “hand-back” 2·6; of movable digit 4·2.

Differs from *U. lineatus* (Koch) and *U. variegatus* (Koch) in

having the vesicle strongly infusate and a very conspicuous V-shaped testaceous mark on the tergites. By this last character also it may be recognized from *U. fallax* (Koch) and *U. striatus* (Koch). From *U. triangulifer* (Thorell) it may be at once separated by the absence of the longitudinal bands on the upper surface of the abdomen; moreover, Dr. Thorell in his elaborate description makes no mention of the enlargement of the basal pectinal tooth.

UROPLECTES FORMOSUS, sp. n. (Plate XIII. fig. 3.)

Colour variegated black and orange-yellow, cephalothorax with tubercle and ante-ocular area wholly black; the lateral portions marked with oblique testaceous bands and the posterior half with transverse testaceous bands; the side margins black; abdomen above with black side margins; marked throughout its extent by two parallel wide black bands alternating with three (one median) narrower yellow bands; the black spot on each of the tergites bears faint indications of the pale V-shaped mark, which is so characteristic of the species of this group; under surface of trunk mostly pale, the posterior abdominal sternite only being deeply infusate at the sides, with a pale black-lined triangular area in the middle behind; tail with four first segments wholly pale above, with a median thin black line and black patches below; fifth segment deeply infusate below and above, but paler in the excavation above; *vesicle* deeply infusate, but marked with paler bands; *aculeus* pale at the base, darker at the apex; *palpi* with almost pale *humerus* and *brachium*, each of these segments being only marked above with two irregularly shaped patches of colour; the *manus* marked with black lines, the spaces between these lines more or less infusate; *dactyli* wholly pale; anterior surface of the legs strongly variegated with black; the *maxillæ* of the first and second pairs infusate.

Cephalothorax with anterior margin nearly straight, the central depression deep behind, shallow in front and over the ocular tubercle; the ocular tubercle with the area immediately at the sides and in front of it wholly smooth, the posterior half weakly and somewhat closely granular.

Tergites. First six almost smooth, marked only with a few lateral granules and a row of granules along the hinder margin; the median keel abbreviated in front and behind and smooth; the seventh tergite rougher than those that precede it; very finely and closely granular in the centre behind, more coarsely and sparsely granular at the sides; the lateral keels short, but coarsely granular, the median elevation low and smooth.

Sternites entirely smooth; sparsely hirsute.

Tail robust, widely and deeply excavated above and very feebly granular; fifth segment deeply depressed above and behind; superior keel well marked and granular on the first three segments, the *terminal* granule being large and tooth-like; superior keel wholly absent on the fifth and represented on the fourth by large granules subserially arranged; the superior lateral keel becomes progressively weaker from before backwards, being scarcely visible on the fourth segment;

inferior and lateral surfaces of first three segments smooth and keelless; inferior surface of the fourth keelless, but granular; inferior and lateral surfaces of the fifth keelless, but thickly and coarsely granular; the whole of the under surface of the tail marked with serially arranged setiferous pores. *Vesicle* smooth above, thickly hirsute and weakly granular below; subacnlear spine small and blunt.

Palpi setose, especially on the fingers: *humerus* marked above with the customary anterior and posterior granular keel; anterior surface bearing larger and smaller granules: *brachium* furnished in front with a few tubercles, the rest of the segment smooth and rounded, without keels or granules: *manus* smooth and rounded, slightly wider than the brachium, neither keeled nor granular and not armed with a tooth: *dactyli* short and curved, in contact throughout, being neither lobate nor sinuate; denticles arranged as in the preceding species.

Legs hirsute, but almost wholly smooth; *tibiæ* of the two posterior pairs spurred.

Pectines armed with 17 approximately similar teeth; the basal tooth being only slightly thicker and slightly shorter than the rest.

Stigmata small and slit-like.

Measurements in millimetres.—Total length 28·5; cephalothorax length 4·2, width 4; length of tail 17; of first two segments 4; of fifth segment 3·5; of vesicle and aculeus 3·8; width of first segment 2·5, of fifth 2·3; humerus length 3; brachium length 3·7, width 1·5; width of manus 1·7; length of 'hand-back' 2, of movable dactylus 3·2.

Two specimens (♀) from Natal; one presented by Ernest Howlett, Esq., the other from the collection of Gueinzus.

This species may be recognized by the wide, undivided, median, longitudinal, yellow band on the abdomen, by the wide black band on each side of it, by the absence of fuscous patches on the upper surface of the four first tail-segments, by its fuscous hands and almost wholly ochraceous humerus and brachium. It differs, in addition, from *U. triangulifer* (Thor.) in being much smoother both above and below.

UROPLECTES FLAVOVIRIDIS, Peters. (Plate XIV. fig. 5.)

Monatsb. Ak. Wiss. Berlin, 1862, p. 516.

Colour. Upper surface of trunk and the whole of the tail of a dark shining green; extremities of the appendages and the sternal surface pale green or ochraceous.

♀. *Cephalothorax* thickly granular; the central depression well marked, deep behind; the ocular tubercle distinctly sulcate and smooth; anterior border widely and lightly emarginate.

Tergites granular, the first six furnished with a well-developed though nearly smooth median keel; the seventh more granular than the preceding, furnished with two granular keels on each side and a median granular prominence in its anterior half.

Sternites bisulcate, punctured, smooth, the last only very feebly granular laterally and not carinate.

Tail robust, almost parallel-sided; conspicuously sulcate above; the upper surface at least of the four anterior segments minutely granular and furnished in addition on each side with a series of larger granules parallel to the keels; the first and second segments with the four superior keels strongly developed, granular at the sides, almost smooth, not carinate, but deeply and sparsely punctured below; the third segment also with the superior keels well developed, but more granular at the sides and more closely punctured below, also bearing a faint indication of the inferior lateral keels; fourth segment with only the superior keel well developed, the rest almost obsolete; the sides and under surface thickly and coarsely granular and punctate; the fifth segment very coarsely and thickly granular below and at the sides, the superior keel obsolete behind; the upper surface hollowed behind. *Vesicle* ovate, smooth above, granular below, except for two smooth tracts which run backwards from the base of the aculeus; the rest granular and setose; a large spine beneath the aculeus, which is of the ordinary form.

Palpi. Upper surface of *humerus* minutely granular, the anterior and posterior keel strongly developed and coarsely granular; anterior surface subtubercular and bounded below by a row of granules; inferior surface almost smooth, feebly granular only in front and proximally; posterior surface furnished with a subtubercular keel; the whole segment sparsely setose: *brachium* sparsely setose; its anterior surface granular and subtubercular; its upper surface behind, its posterior and inferior surfaces smooth and rounded and punctured: *manus* hairy, with a tubercle at the base of the dactyli on the anterior surface, smooth, rounded, neither granular nor costate: *dactyli* very hairy, moderately long and curved, in contact throughout, neither sinuate nor lobate; the arrangement of denticles is much the same as in the preceding species, *i. e.* in the distal third, owing to the enlargement and partial isolation of the distally apical tooth of the separate rows which constitute the median series, the inner series is composed in this part of the digit of pairs of teeth.

Legs with *femora* anteriorly granular, but only subcarinate above; *patellæ* almost wholly smooth, the fourth pair only slightly granular; *tibiæ* of two posterior pairs armed beneath with a spur; *coxæ* smooth.

Pectines projecting beyond the edge of the fourth *coxæ*; furnished with 23 or 24 teeth, whereof the basal tooth is enormously enlarged but not longer than the rest.

Stigmata slit-like.

♂. Differs from the ♀ in having the tail much longer (*cf.* measurements), in having the hand longer and armed with a larger and sharper tooth, and in having the basal pectinal tooth like the rest of the series.

Measurements in millimetres.—♀. Total length 38; cephalothorax length 5, width 5; length of tail 24; of first two segments 6·7; of fifth segment 5; width of first segment 4·3; of fifth 3; length of humerus 4; of brachium 5; width of brachium 2; of manus 1·8; length of

'hand-back' 2·3; of movable dactylus 5. ♂. Total length 45; length of cephalothorax 5; of tail 27, of first two segments 8, of fifth 6; width of first and fifth 4; length of humerus 4·7; of brachium 5·5; width of brachium 2; of hand 2; length of 'hand-back' 3; of movable dactylus 5·5.

The Museum has two specimens of this species from Lake Nyassa (Universities' Mission), and four ticketed merely E. Africa from the collection of Capt. Speke.

This form may be recognized from all its allies by the uniformly green tint of the upper surface; moreover, the superior lateral margins of the fifth caudal segment are elevated behind, terminate abruptly and not gradually as in the other species. The spine on the inner surface of the hand points apparently to affinity between this species and *U. triangulifer* (Plate XIII. fig. 5), of which the Museum possesses a single male specimen from Pietersberg. But the form of the vesicle in the ♂ of *triangulifer* is sufficiently peculiar to differentiate the species from all others.

RHOPTRURUS KIRKI, sp. n. (Plate XIV. fig. 1.)

Colour almost a uniform ochraceous tint throughout, the terminal segments of the tail and the dactyli of the palpi being somewhat darker.

Cephalothorax divided throughout by a median sulcus, lightly emarginate in front, its posterior width greater than its length; closely but feebly granular throughout; ocular tubercle prominent, deeply and widely sulcate and perfectly smooth; central eyes large and separated by a space about equal to a diameter; lateral eyes three on each side.

Tergites finely and closely granular throughout; from the second to the fifth armed with a low granular posterior median keel; the seventh with a low median keel in front, and two, more coarsely granular, anteriorly abbreviated keels on each side.

Sternites mostly smooth, the fourth granular laterally, the fifth very feebly, if at all, granular in the centre, more coarsely so at the sides, bearing traces of four abbreviated granular keels.

Tail very smooth, furnished only with exceedingly minute granules, almost parallel-sided, the fifth segment being only slightly wider than the first; the first segment bearing traces of ten minutely granular keels, the second and third segments with faint traces of but eight keels, the fourth with scarcely perceptible traces of the keels, and the fifth with scarcely perceptible traces of five keels; *vesicle* smooth above, minutely granular beneath, the spine beneath the aculeus simple, large and sharp.

Palpi. Upper surface of *humerus* minutely and closely granular, bounded in front and behind by a coarsely granular keel; anterior surface minutely granular and furnished with many larger tubercles, inferior surface very finely granular, posterior surface more coarsely granular; upper surface of *brachium* very finely granular throughout and furnished with more coarsely granular keels; anterior surface also minutely granular and furnished with several